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Assessing the effect of patient to provider language discordance on depression screening utilizing the Patient Health Questionnaire: an epidemiology study.

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Epidemiology Study

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Key Messages

1. Depression screening rates are lower in Spanish speakers than English speakers
2. Men are less likely to be screened for depression compared to females
3. Rates of depression screening increase with better office continuity

ABSTRACT

BACKGROUND: **As depression screening becomes a standard in primary care, the question remains of how effective and equitable screening can be implemented to avoid cultural and language related disparities.**

METHODS: **In this retrospective cohort study, rates of depression screening were compared for 3626 adult patients at a family medicine residency-based health center in Pennsylvania, United States of America. The PHQ-2/PHQ-9 modality was verbally administered by nursing staff at the time of patient intake as part of a universal screening initiative. Chi square analysis was used to determine the univariate associations of performed depression screening with variables of language, ethnicity, gender and number of office visits. A binary logistic regression was then performed to measure if univariate associations remain significant after correction for other variables.**

RESULTS: **Chi square analysis revealed significant differences in screening based on univariate associations of language, gender and number of office visits. No significant difference was found for age nor ethnicity. Binary logistic regression revealed the following odds ratio of being screened for depression for each variable: Spanish language (OR 0.694, CI 0.559-0.862), female gender (OR 1.155, CI 1.005-1.328), and office visit frequency of 3 or more office visits per year (OR 2.103 CI 1.835-2.410).**

CONCLUSIONS: **Spanish-speaking adults were significantly less likely to be screened for depression than their English-speaking counterparts. Women were more likely to be screened than men and the odds of screening increased with more frequent exposure to the office. Future studies should be directed at validating these findings in multiple clinical settings.**

KEYWORDS: Depression, Family Health, Health Disparities, Primary Care, Risk Assessment and Screening

Introduction:

Mental health is a growing component of family medicine with many in primary care serving as the de facto psychiatrist within resource limited populations [1,2]. There is also increasing literature on the incorporation of psychiatric services within a patient centered medical home model (PCMH)[3,4]. As need for services prompt innovative care delivery models, many patients are receiving increased access to quality care. Despite these advances, an important challenge remains: how to efficiently and effectively screen for depression in busy primary care offices. Moreover, how can providers ensure that screening modalities are administered uniformly throughout their patient population?

The prevalence of depression has been rising in the United States[5]. This disease process leads to significant symptomatology which can often affect multiple facets of a patient's life and is the leading cause of disability in persons 15 years and older[6]. As a result, the United States Preventive Services Task recommends universal screening for depression in the adult population to properly identify and treat this prevalent condition (Recommendation B)[6].

A validated modality for depression screening in primary care is the two question Patient Health Questionnaire (PHQ-2). If the patient answers affirmatively to one question, a longer survey (PHQ-9) is performed to grade severity of depression. The PHQ modality has excellent sensitivity for depression screening, with one meta-analysis reporting a sensitivity of 92 % with a specificity of 80 %[7]. The PHQ was also shown to have higher sensitivity of depression screening / diagnosis when compared to other leading algorithm methods[8]. PHQ screening has also proven to be culturally adaptable with validation of use in Latino populations[9-11]. This versatility is of paramount importance given rising rates of depression within the Latino population[12-15].

Despite the validation of the PHQ, there have been few studies that compare rates of screening for depression between Latino and Caucasian populations. When studies do examine screening differences along ethnic variances, differences in language is not included in the determinations of screening likelihood[16]. This is an important distinction as availability of screening tools do not necessarily imply equity in administration. Previous studies document this concept with observation of screening disparities for colorectal, breast and cervical cancer within the Latino community[17-19].

As depression impacts multiple facets of one's life, underdiagnoses secondary to screening disparities could have far reaching implications into societal arenas such as substance abuse, poor work productivity or increased absenteeism. Emerging research draws connections between depression and its role in the pathophysiology of other chronic diseases such as diabetes and heart disease[20-23]. From this standpoint, under treatment of depression could lead to overall worsening outcomes for other chronic diseases. This would be particularly devastating among the Latino community where there are already disparities in chronic disease outcome measures when compared to non-Latino counterparts[24-27]. Because of these far reaching implications of undiagnosed depression, some hospital networks are now instituting universal depression screening protocols wherein system wide quality metrics are linked to percentages of patients screened. The question remains however, if such universal screening methods are administered in a manner that minimalizes disparities among differences in language and culture.

In this study, we examined rates of depression screening for a cohort of patients in a busy family medicine residency program in Pennsylvania, United States of America. This office had recently been designated as a trial site for a hospital wide depression screening protocol utilizing the PHQ methodology. **The purpose of the study was to determine if language discordance between providers and patients led to a difference in depression screening between Spanish and English-speaking patients. Prior studies suggested that certain demographic variables such as gender are associated with disparities in depression screening[16,28]; however, this study intends to explore if language also plays a role after corrected for these other demographic variables.**

Methods:

Clinical Setting:

This retrospective cohort study was conducted at a Federally Qualified Patient Centered Medical Home, Family Medicine Resident clinical practice in **Pennsylvania, United Sates of America**. The population served by this clinic included patients from suburban and urban locations with a mix of private and government (Medicare and Medicaid) insurances. **There was a total of 7 nurses employed in the practice who were responsible for administering depression screens to all patients. None of the nurses spoke Spanish however, all had access to licensed translators via phones located in the**

patient rooms. Nurses were expected to use these translators when interacting with Spanish Speaking patients. Of note, the lead author of the study was actively seeing patients in the practice during the one-year study although, there was not prospective knowledge of the evaluation during the study year.

As mentioned above, this practice was designated by its parent hospital system as a trial site for a universal **annual** depression screening initiative. Per protocol eligibility, all charts of patients older than 18 were flagged with a yearly reminder to perform a PHQ screen via a health maintenance tab in the EPIC^{R} electronic medical record (EMR). **PHQ 2/9 surveys were to be administered to patients regardless of prior diagnosis of depression, anxiety or other psychiatric conditions.** When patients arrived for an office visit, nursing staff would see the EMR flag and verbally administer the PHQ 2 (and if applicable PHQ 9) screen. No paper surveys were administered. **If the patient spoke Spanish, nurses were expected to use the available phone translators to administer the survey.** For those who had a prior diagnosis of depression, the screen was performed to determine severity of the condition. Results of the PHQ-2/9 were entered into the patient's electronic chart. Once the screen was administered, the yearly reminder was satisfied and the electronic flag was removed from the chart**. The internal goal for the protocol was to achieve a 50 % screening rate for the entire eligible population within the first year.**

Data Collection:

The EMR mining tools WebFOCUS and SAP^{R} Data Services were used to retrospectively collect data from all patient encounters to the clinical site between the months of 12/2014 and 12/2015. This time range was chosen as it was the first full calendar year of implementation of the aforementioned universal PHQ screening protocol. Patients under the age of 18 were excluded because depression screening in this population occurred via a different mechanism**. A total of 6 patients were excluded from analysis because they did not provide information on ethnicity. The final study population included 3626 patients.**

The independent variables that were included in the study were patient age, preferred language, ethnicity, gender and number of encounters with the office during the one-year time span. These

variables were chosen to control for other possible causes of screening discrepancies. **The independent variables were categorized in a binary fashion as follows: Age listed as under 65 vs greater than or equal to 65. Sixty-five was chosen as this is the age in the United States when most individuals qualify for government health insurance. Language was categorized as Spanish vs English speaking. Ethnicity was Hispanic vs Non-Hispanic (note: all Spanish speaking patients identified as Hispanic while not all patients identifying as Hispanic identified as Spanish Speaking). Gender was male and female with no study members identifying as gender other. Number of office visits was divided by those with 1-2 visits per year compared to those with 3 or more visits. This categorization was chosen as it divided the population at the median number of office visits. The dependent variable was a binary output of depression screening status over the study year.**

Once data was collected, parameters were generated for considering an individual as screened for depression. The first parameter was the presence of a PHQ-2 or 9 score within the patient's chart during the study year. The patient was also considered screened if he or she had a referral to a mental health provider during the study year. The rationale for this criterion was that even if a PHQ was not recorded, a referral indicated that a conversation regarding mental health had occurred and thus the patient was effectively screened for depression. Finally, patients were considered to have met screening requirements if any screening had occurred in the year prior to our study year. This parameter was added to capture patients who would not have been eligible for screening during the study year because they had been screened for depression within the past 12 months.

Statistical Analysis:

All data analysis was performed in SPSS v25.0. Demographic analysis was performed on all study variables. Discrete data were reported as count and percentage per category. To explain the predictive aspects of language on screening status a logistic regression was performed using only the variables found to be significant with the univariate associations with screened status as determined by chi-square analysis. These variables were gender, language, and number of visits as covariates. Logistic regression results were reported as Beta coefficient, p-value, odds ratio

(OR) with 95% confidence interval. References categories were English Language, Male gender and the category of 1-2 office visits per year.

Results:

The breakdown of total patients within each independent variable category is exhibited in Table 1. There were overall more females (62.7%) than males (37.3%) and more patients younger than 65 (84.8%) than over 65 (15.2%). A total of 35.6 % of the study population identified as Hispanic with 10.7 % listing Spanish as primary language. Per study criteria, the total number of patients screened for depression during the study year was 2171 (59.9 %). A total of (2138) were screened by PHQ whereas (33) were determined screened by way of being referred to psychiatry. The overall screening rate exceeded the internal goal of 50 % screening within the first year of the universal protocol.

The results of chi square analysis for univariate association between independent variables and depression screening is listed in Table 2. For the variable of language, a higher percentage of English speaking patients (60.6%) were screened for depression than Spanish speaking patients (53.7%) (p-value 0.009). Regarding gender,61.4 % of females were screened compared to 57.2 % of males (p-value 0.012). Finally, there was a higher percentage of depression screening in patients who were seen in the office 3 or more times during the study year (68.7%) compared to those who were only seen 1-2 times (51.3 %)

Univariate associations with p-values less than 0.05 included age and ethnicity. The percentage of patients less than 65 who were screened for depression was 60.3 % while 57.5 % of patients 65 and older were screened. The difference of depression screening within the Hispanic and non-Hispanic was even closer with percentages of 60.7 % and 59.4 % respectively.

The results of the binary logistic regression for statistically significant variables from the chi-square analysis are displayed in Table 3. With English as the reference category, the odds ratio for depression screening in Spanish speaking patients was 0.694 with CI 0.559 – 0.862 (p-value 0.001). The OR for screening in females was 1.155 CI 1.005-1.328 (p-value 0.043). Finally,

those who had 3 visits or more to the office within the study year had a depression screening OR of 2.103 Cl 1.835-2.410 (p-value <0.001).

Discussion:

The results of this study reflect the differential odds of being screened for depression among selected demographic variables. The effect of language discordance between patient and nurses administering depression screens was the focal point. The chi-square univariate analysis of association showed two variables that did not have significant associations with depression screening as defined by p-values >0.05. These variables were age (p= 0.223) and ethnicity (p = 0.452). The variables that did show significance were language (p=0.009), gender (p=0.012) and office visits per year (p=<0.001). A binary logistic regression was then run on the significant variables from chi square analysis to correct for confounding relationships. The results of this analysis revealed that significant associations to depression screening were maintained for the variables of language, gender and frequency of office visits.

Gender differences in screening were notable with women having a screening OR of 1.155 [Cl 1.005-1.328] when compared to males. Again, this association was found to be significant even after accounting for differences in frequency of office visits per year and language. This finding is consistent with prior literature indicating that women are more likely than men to be screened for depression[16,28]. While protocol dictates that all-comers be screened, these results point to possible underlying biases among health care providers in their prioritization of who receives screening during a busy office session. It should be noted here that a possible underlying contributor to this bias is the fact that all nurses administering screens were female. Therefore, a differential level of comfort may exist with gender concordant screening.

Another significant variable was the association between frequency of office visits and odds of being screened for depression. The analysis revealed that those who had 3 or more office visits per year had an OR of 2.103 for being screened [Cl 1.835-2.410] compared to the reference category of 1-2 office visit per year. The association of greater odds of depression screening for those with more office visits per year is certainly logical as greater exposure to the office would

result in more opportunities to be screened. The main purpose of including this visit frequency variable was to control for its possible confounding effects on the other variables of the analysis. As mentioned previously, the binary nature of this variable was chosen because it reflected the median amount of office visits per year for the study population.

The main outcome of interest for the study was the comparison of screening rates between Spanish and English speakers. As noted previously, all Spanish speaking patients self-identified as Hispanic while English speaking patients consisted of a mix of Hispanic and non-Hispanic ethnicities. When comparing univariate associations by chi square analysis, there was no statistical difference in screening between those identifying as Hispanic vs Non-Hispanic. When comparing language associations, we found Spanish speaking patients had lower rates of screening than English speaking patients. This association remained even after binary logistic regression with an OR of 0.694 [CI 0.559-0.862] for Spanish speaking patients.

The results of this analysis do raise some concern as there seems to be an association of poorer screening rates of depression for Spanish speaking patients even after accounting for differences in gender and number of office visits per year. When considering the screening protocol, nurses were responsible for administering the paper PHQ surveys to all patients. While none of the nurses spoke Spanish, all nurses had ample access to live telephone translators to assist in administering the survey. However, in a busy clinical setting, time spent on communicating through a third party diminishes the overall patient time allotment that is shared between physician and nurses. With competing interests including chronic and acute disease management, it is easy to envision preventative or "non-urgent" tasks being triaged to later appointments. Unfortunately, the data suggests that screening does not always occur for Spanish speaking patients at a later visit as the cycle likely repeats itself.

Another possible contributor to poorer rates of screening in Spanish speaking patients is the sensitive nature of verbally administering a depression screen. The PHQ questionnaire probes difficult topics such as feelings of inadequacy and suicidality. The thought of attempting to navigate these questions through a translator may seem insensitive to some practitioners and

thus he or she will opt to not administer the screen. Our study suggests that the unintended consequence of this action at a population level is that less Spanish speaking patients are screened. This can lead to underdiagnoses of a serious chronic condition in an already vulnerable population.

This study had several limitations for external application. One such limitation is that the results are specific to this clinic population. Values reflect the care protocols of this office and the demographics of the staff. Despite this limitation, certain trends in screening disparities along gender variables were similar to results from prior studies as discussed above. Another limitation is that because of restrictions in our EMR mining tools, we could not accurately incorporate additional variables such prior history of mental illness. This limitation exists because of the multiple different variations in anxiety, depression and mental health billing codes that would make it exceedingly difficult to ensure all diagnoses have been included in the mining algorithm. Regardless, the current ability of EMR mining is a great tool for primary care physicians to study trends in their own population for the purposes of quality improvement. Finally, our depression protocol relied on verbal discussion of the PHQ survey as opposed to patient self-completion surveys. Therefore, independent provider / nurse comfort with administering such a tool may have also biased results. Rates of screening may have been different if patients filled out their own surveys; although, this method would need to be adjusted for variance in literacy rates.

Conclusion:

The present study examines the effect of language on rates of screening for depression. Current results indicate that those who speak Spanish are significantly less likely to be screened for depression than their English-speaking counterparts. Furthermore, our study indicates that women are more likely to be screened than man and that odds of screening increases with increasing exposure to the office. Future studies should be directed at validating these findings in multiple clinical settings. Exploration of depression screening rates in language concordant provider patient interactions will also be germane in further delineating factors that contribute to disparities in screening.

Declarations / Acknowledgements:

ETHICS: This study was reviewed by the Reading Hospital Research Advisory Committee and obtained an exemption status from the IRB for deemed low risk exposure to human subjects.

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Table 1 Demographic Data of Study Population During Study year 2014-2015

Variable	Category	Count	Percentage
Gender	Male	1354	37.3
	Female	2272	62.7
Age	<65	3075	84.8
	65+	551	15.2
Ethnicity	Not Hispanic	2336	64.4
	Hispanic	1290	35.6
Language	English	3237	89.3
	Spanish	389	10.7
Office Visits per Year	1-2	1836	50.6
	3+	1790	49.4
Screened for Depression	Yes	2171*	59.9
	No	1455	40.1

*33 patients had no documented PHQ but were deemed screened for depression by way of referral to psychiatry

Table 2 Comparison of Univariate Associations in Depression Screening Rates within Demographic Subcategories

Variable	Category	Screened for Depression	Not Screened for Depression	Percentage Screened	p-value
Gender	Male	775	579	57.2	0.012
	Female	1396	876	61.4	
Age	<65	1854	1221	60.3	0.223
	65+	317	234	57.5	
Ethnicity	Not Hispanic	1388	948	59.4	0.452
	Hispanic	783	507	60.7	
Language	English	1962	1275	60.6	0.009
	Spanish	209	180	53.7	
Office Visits per Year	1-2	941	895	51.3	<0.001
	3+	1230	560	68.7	

Table 3 Results of Binary Logistic Regression for the Association of Depression Screening with Demographic Variables that Exhibited Statistically Significant Univariate Associations

Variable	Category	Beta	p-value	Odds Ratio	95% CI LB	95% CI UP
Language	English	Ref				
	Spanish	-0.365	0.001	0.694	0.559	0.862
Gender	Male	Ref				
	Female	0.144	0.043	1.155	1.005	1.328
Visits	1-2	Ref				
	3+	0.743	<0.001	2.103	1.835	2.410